

The Citrus Industry

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JACKSONVILLE, FLORIDA

HARD HIT — BUT NOT OUT

Florida citrus growers were hard hit by the tropical hurricane which crossed the state on October 19, striking with full force at the very heart of the citrus belt. The loss to growers will amount to many millions of dollars, just how many millions even the best informed are not prepared to say. Estimates vary, ranging up to \$25,000,000, but it is generally conceded that no accurate, or even approximate, figures can be given until time shall determine the extent of damage to fruit still hanging on the trees.

Grapefruit growers sustained the greater loss, ranging from near total in some sections hardest hit down to fifteen or twenty percent in more favored sections. Oranges and tangerines came through in better shape, but even so the grove owners sustained a serious loss, estimates ranging from fifteen to twenty-five percent. In some sections many trees were broken off or uprooted and the loss from this source will be very material.

The loss to citrus growers is probably greater, both in percentage and in actual money value, than in any previous storm, even those which caused greater loss of life and greater damage to cities, roads and public utilities of the state.

But, while citrus growers have been hard hit, they are far from out. The citrus industry of Florida has weathered many previous disasters and came through to build a greater and more profitable industry. There was the "big freeze" in which trees in many sections were frozen to the ground; there was the invasion of citrus canker which threatened destruction of the industry; there was the Mediterranean fruit fly, which again brought heavy loss to growers and for a time threatened extinction of the industry. Yet Florida citrus growers never lost heart but set about to further expand their holdings and increase their plantings. Of such material are citrus growers made. In the present emergency we may look for a repetition of the courage and initiative with which they have met former disasters and threats of disaster.

GROVES NEED EXTRA CARE

Many groves in the path of the recent hurricane were severely damaged aside from the loss of fruit. Trees were blown down, limbs were torn off; in some sections, particularly in coastal regions, trees were defoliated. Many trees were left in a weakened condition.

Such groves will need extra care. Growers will

find themselves burdened with an extra job of pruning and general care-taking. Injured and weakened trees must be nursed back to healthy condition; many trees must be replaced; there will be need for much rebudding where tops were blown away but trunks left standing. Even where serious injury is not apparent, the trees will need extra care. Spraying and fertilizing operations will require special attention.

The loss of fruit is the immediate problem of the growers, but it is only one of the problems. Rehabilitation of damaged groves will receive the special attention of forward-looking growers. Such attention now will pay heavy dividends in the near future.

NEW CEILINGS HELP GROWERS

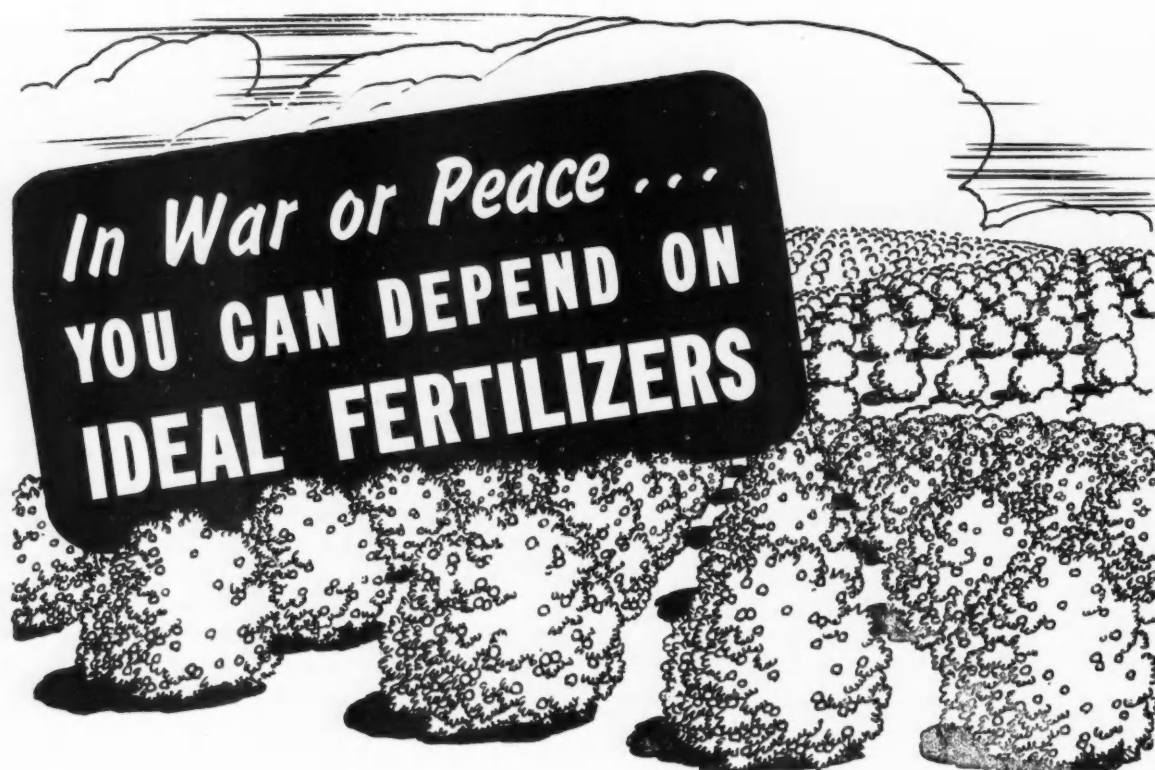
Immediately following the recent hurricane Florida citrus growers appealed to the Office of Price Administration for higher ceiling prices on grapefruit and oranges to partially offset the loss occasioned by the storm. In this effort the growers had the support of Senators Andrews and Pepper, Congressman Peterson, whose district sustained the major loss, and other members of the Florida delegation in the Congress.

On November 3, two weeks after the storm, the new ceiling prices were announced, raising the grapefruit ceiling 81 cents per box and orange prices 45 cents per box. These increases are generally approved by Florida growers. However it is not anticipated that the entire increase in ceiling price on grapefruit will be realized by growers, since their fruit comes in direct competition with Texas grown fruit on which no increase in ceiling is allowed. The 45 cents per box increase in the ceiling prices on oranges may be realized, since California already has a higher ceiling price on that fruit.

Work of the Florida delegation in congress in urging the higher ceiling prices is appreciated by the growers.

WALKER TAKES NEW JOB

Marvin Walker, long and prominently connected with the citrus industry of Florida and lately associated with the Florida Citrus Exchange as assistant general manager, has been chosen as general manager of the Florida Citrus Producers Trade Association and has already assumed the duties of his new position. Walker formerly held the same position, but left it two years ago to become Secretary-Manager of the Florida Citrus Commission.



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Tangerine Juice Concentrates¹

A Method of Utilizing Cull Tangerines in Preparing A Tangerine Sirup And Beverage Bases

A tangerine sirup rich in sugar and vitamins and two types of beverages bases have recently been developed by research chemists C. D. Atkins and E. L. Moore of the Florida Citrus Commission in co-operation with chemists of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, at the Citrus Products Laboratory, Winter Haven, Florida.

Because difficulties have been encountered in the commercial canning of tangerine juice, a sirup with a

and filtered, and vacuum concentrated to 70° Brix. This brown honey-like product may be bottled attractively for home use as a table

gerine byproducts will aid in returning to the farmer some of the growing and picking costs.

An article entitled "Tangerine



Preparation of Tangerine Juice Concentrates in the Laboratory—
C. D. Atkins

light-brown color and a sweet fruity taste has been developed from the juice of tangerines. In the preparation of this sirup, firm cull tangerines are washed and the juice is expressed by passing the fruit through a screw press. Then the juice is screened to eliminate larger particles of peel and pulp, neutralized

¹/ Bureau of Agricultural and Industrial Chemistry Outside Publication No. 4368.



Preparation of Tangerine Juice Concentrates in the Laboratory
E. L. Moore and C. D. Atkins

sirup rich in fruit flavor and vitamin C or it may be put in large containers for shipment to manufacturers of other products as a source of sugar, vitamin C, or a substitute for glycerine.

Other tangerine juice concentrates of fine commercial possibilities are the tangerine beverage bases that contain all of the natural fruit acids. In the preparation of beverage bases, the screened juice may or may not be filtered depending upon the transparency or type of product desired, and vacuum concentrated to 65° Brix. The resulting concentrate is pasteurized, bottled, and held in 40° F. storage until used. This concentrate possesses a fine fruit flavor, excellent retention of vitamin C, and in addition a high acid content which is desired by the beverage industry.

These products have already attracted the attention of several local citrus processing plants, that have available equipment necessary for their manufacture. It may reasonably be expected that the production of these concentrates together with other existing commercial tan-

gerine Products," by C. D. Atkins, E. L. Moore and J. L. Heid, which appeared in the January 1944 issue of *The Fruit Products Journal* describes the details of the process and products.

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Jacksonville, Florida



Publication office at Bartow, Florida. Entered as second class matter February 16, 1920, at the post office at Tampa, Florida, under the act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Citrus Growers Sustain Heavy Losses

In an effort to secure the most accurate report of the damage done to Florida's fruit crop by the high wind which struck the state on October 18th and 19th, The Citrus Industry has contacted various agencies throughout the state, who as a result of their wide contact with the growers throughout the citrus area we felt should be able to give the best picture of the effects of the storm upon the present season's crop.

All the agencies which reported indicated that the loss was serious particularly on grapefruit and that still further loss may be anticipated on both oranges and grapefruit which may have been damaged on the trees and which may be expected to fall later on.

As one prominent citrus factor concisely stated it, "The map of the citrus area of Florida could be traced almost perfectly by the path of the hurricane through the state."

Reports from the various groups contacted follow:

The Citrus Commission

The earliest official report of damage was a composite statement made through the Florida Citrus Commission which indicated that Florida had lost "approximately 50 percent of its grapefruit and from 20 to 25 percent of its oranges and tangerines." The report further indicated that additional losses might be

expected as a result of weakened fruit dropping to the ground later.

The Citrus Exchange

C. C. Commander, general manager of The Florida Citrus Exchange, in response to a query from The Citrus Industry wired as follows: "Just returned from an extended inspection trip over most citrus areas. Damage from slight to total loss. Impossible determine loss from damaged fruit on trees on account of effect of weather conditions. My opinion present and anticipated losses on grapefruit from 40 to 50 percent, on oranges and tangerines from 15 to 25 percent. Will be necessary to make some changes grading specifications because of scars and blemishes from wind."

War Food Administration

W. F. Miller, representing the War Food Administration stated on Oct. 31st that approximately 25,000,000 boxes of fruit were blown from the trees, representing approximately 43 percent of the grapefruit crop, while the orange crop loss was estimated to be 19 percent.

Fertilizer Companies

Because of the fact that every major fertilizer company has a large number of field service men who are familiar with every section of the citrus area of the state we contacted many of these firms asking them to submit to us the reports they had received.

W. L. Waring, Jr., president, Lyons Fertilizer Company, Tampa, rendered a detailed report of the findings of its service men in which they reported Lee, Charlotte and Hendry counties as having a loss of 40 to 50 percent on grapefruit, and 15 to 20 percent on oranges. The loss for Sarasota, Manatee, Polk, Hardee, DeSoto, Highlands and Orange counties was reported as 75 percent for grapefruit and 25 percent on oranges. In Hillsborough county this company reported a grapefruit loss of from 25 to 50 percent with from 10 to 15 percent loss on oranges. In Pinellas county the loss was reported as 40 to 50 percent on grapefruit and 15 to 20 percent on oranges. In Pasco, Hernando and Citrus counties they reported grapefruit loss of from 20 to 25 percent and oranges as being 10 percent. In Lake and Marion counties they reported a loss of 25 to 30 percent on grapefruit and 10 to 15 percent on oranges.

G. D. Sloan, president of Superior Fertilizer Company, Tampa, reported "the most severe loss with the exception of individual groves, was in Polk county from Frostproof north. The individual sections are to be found on Pine Island, Lee county, where not only 100 percent of the fruit is lost but also the foliage and, in some cases, consid-

(Continued on page 13)

A Second Year Of Citrus Research On Byproducts

And Problems Of The Citrus Canning And Concentrating Industry In Florida¹

June 1944 marks the end of the second year of cooperative research on citrus byproducts by the Florida Citrus Commission and the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration at the U. S. Citrus Products Station, Winter Haven, Florida. Three Florida Citrus Commission research fellows, in cooperation with Federal chemists, have dealt with research on citrus byproducts and the problems of the canning and concentrating industries.

Wartime emergencies have increased the demand for immediate and reliable information on such problems as the suitability of glass containers as a substitute for tin containers in packing citrus juices, the storage life of these canned goods, and the prevention of losses from spoilage of canned citrus products. Special projects planned to meet these needs, along with the ever-important work on utilization of citrus byproducts, have made up the research program.

Concentrates and Powdered Juices

Before the war Florida was producing 3 percent of the U. S. total of concentrated citrus juices; in 1943 its four commercial plants turned out over 35 percent of the total purchased by the Government for Lend-Lease shipment to our Allies.* Such concentrated products will likely have greater popularity after the war when increased quantities may be made available to hospitals, institutions, hotels, and restaurants throughout the country; and citrus concentrates from Florida will probably help in post-war feeding problems in Europe.

With a view to improvement of the flavor and keeping qualities of

orange juice concentrate, three Florida packers during the past season have furnished samples of concentrate for bacteriological, color and flavor examinations, and chemical analyses. Tests are being made

on mising dry products have been made from orange juice by the addition of stabilizing materials. Experiments are being continued with the aim of producing a good quality, pure dry orange powder at a moderate



High Vacuum Double-Drum Dryer for Producing Powdered Citrus Juices—
Florida Citrus Commission Research Fellows, E. L. Moore,
E. Wiederhold, C. D. Atkins

regularly on the concentrates kept at various storage temperatures.

Work is in progress on comparisons of orange juice concentrates made at the temperatures and pressures used in commercial plants, with those made at lower temperatures and pressures. Some of the latter concentrates have been diluted with various amounts of fresh orange juice before canning, and a public service patent is being applied for in order to protect this process for public use. Some of these products have been quick-frozen for 8° F. storage, and some are being held in cold storage at 40° F. The reconstituted juices are being compared at intervals for color, flavor, and vitamin C content.

A double-drum dryer with facilities for producing a high vacuum has been installed for the purpose of studying its suitability for drying citrus juices, and several pro-

cost. It is also planned to attempt the preparation of other powdered citrus juices by this method.

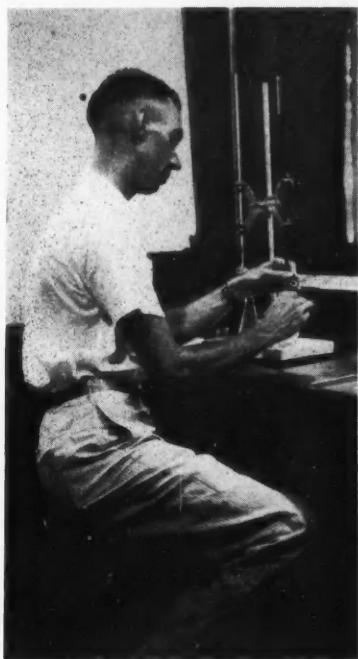
Glass and Tin-Packed Products

Investigations were made of the changes occurring in unsweetened orange juice and grapefruit juice during commercial processing and subsequent storage for 6 months of products packed in glass and tin containers. Processing studies made at the canning plant indicated high vitamin C retentions in the juices (98 - 99 per cent). Samples were stored at room temperature (average 80° F.) and in cold storage (40° F.). It was found that bottled juices lost slightly more vitamin C during 6 months of storage than did juices in tin containers, but at the end of the 6 months' storage period all juices, regardless of type of container, could still be considered excellent sources of vitamin C. During the storage period all bottled

¹/ Bureau of Agricultural and Industrial Chemistry Outside Publication No. 4369.

* Figures taken from Western Canner and Packer, Vol. 35, No. 13 P. 25.

and canned juices retained their color well with the exception of the bottled grapefruit juice held at room temperature, which at the end of 5 months showed definite browning. In general, all cold-room samples of juice showed little change in flavor



Titration of Vitamin C in Citrus Juices — E. L. Moore

during storage. At the end of the 6 months' storage period at room temperature, however, the orange juices in glass and tin containers were somewhat off-flavor; the bottled grapefruit juice was considered unpalatable, but the grapefruit juice in tin containers was still satisfactory. These results (Moore, Wiederhold, and Atkins, 1) indicated that plain tin was preferable to glass for packing grapefruit juice when the juice was to be stored at room temperature. Glass-packed citrus juices should be kept in cold storage for maximum retention of vitamin C and to retard the development of off-flavors and colors. These orange and grapefruit juices packed in cans or bottles, even after a year's storage at 40° F. were good in flavor, had an attractive color, and remained excellent sources of vitamin C. This work is being continued and a further report giving these results for a year's storage period will be published at a later date.

In an effort to obtain information on the shelf life of glass-packed

citrus juices after removal from cold storage, a pack of grapefruit juice in glass containers was put up by the research fellows at the U. S. Citrus Products Station, Winter Haven, Fla. This experimental pack is being stored in the cold room (40° F.) and samples removed to room temperature at intervals, to be held at room temperature for varying periods of time before testing. Control samples are being stored at 40° F. and at room temperature. Periodic examinations are being made for retention of vitamin C, color, and flavor.

Citrus Juices

In cooperation with the Florida Canners' Association, a survey was made of the vitamin C retention in Florida grapefruit juices during commercial canning. Twelve central Florida canning plants which packed over half of the unsweetened grapefruit juice canned in the state, cooperated in this survey. Equipment for sampling and testing of the juices was taken to the plants and analyses were made at the plants on unsweetened grapefruit juices. Samples were taken at various points in the canning operation so that the

grapefruit juice. Results of this study on storage will be published in the near future.

In order to answer requests for information on how rapidly vitamin C is lost from freshly extracted orange juice and grapefruit juice, a controlled experiment was carried out, using hand-reaming and machine-reaming for extraction of the juices, which were then stored in covered and uncovered glass jars at room temperature and in a cold room (40° F.). This investigation indicated that fresh grapefruit juice and orange juice retained over 97 percent of their vitamin C content even after 3 days at room temperature, at the end of which time many of the samples had started to ferment. A complete report on these findings is being submitted for publication.

Citrus Byproducts

A process was developed (Atkins, Moore, and Heid, 3) which it is believed will benefit growers greatly in the profitable disposal of surplus tangerines, thus helping to stabilize tangerine production and marketing. Besides recovery of cold-pressed peel oil, the method provides for either



Bacteriological Control of Citrus Products — E. Wiederhold

part of the plant procedure causing the loss, if any, could be ascertained. The results obtained (Moore, Wiederhold, Atkins, and MacDowell, 2) indicated that with the present methods in use in Florida, over 97 per cent of the vitamin C was retained during the canning operations. Samples of these canned juices were brought back to the laboratory and stored at room temperature to furnish information on retention of vitamin C. After 6 months of storage there still remained, on the average, 83 percent of the vitamin C that was in the freshly canned

the production of a concentrated beverage base or a bland table sirup. These products, because of their value as byproduct outlets have already attracted the attention of several local citrus processing plants, that have available equipment necessary for their manufacture. The high food value and pleasing flavor of these sirups and beverage bases, together with current shortages, should insure a receptive market.

A part of each year's crop of Persian limes is not shipped because of market conditions and because of size and grade restrictions. There

is increased interest in the quantity of oil from this fruit which may be recovered by various methods. Lime oil is extensively used by manufacturers of confections and flavoring extracts and has demanded higher prices than most other volatile citrus fruit oils. Preliminary tests (At-

kins, Wiederhold, and Heid, 4) indicated that by the use of a tapered-screw press about one-third of the oil present in the whole fruit could be recovered as cold-pressed lime oil in a laboratory model centrifuge. Work on this project will be continued this season, and also some experimental work will be done on the preparation of powdered lime juice.



Determination of Gas Content in Canned Citrus Juices — C. D. Atkins

A process was developed (Pulley, Moore, and Atkins, 5) for the preparation of crude dried citrus pectin from waste grapefruit peel. The crude pectin, or refined pomace, is produced by leaching properly treated grapefruit peel with water and then drying and grinding the leached peel. The grapefruit cannery residue, about half of which was formerly hauled and dumped on pastures, groves, and wasteland, is the source of the raw material that can now be used for making either crude or pure pectin. Two plants in the state have taken advantage of this experimental work and a high-grade product is being manufactured commercially.

An analysis of the vitamin C content of citrus fruit used in commercial canning indicated that the juice of the oranges and grapefruit examined contained only about one-fourth of the vitamin C present in the fruit. It was found that the

bases as a source of fruit flavor, natural vitamins, and pectin.

Publications

(1) Changes Occurring in Oranges and Grapefruit Juices During Commercial Processing and Subsequent Storage of the Glass- and Tin-Packed Products. Edwin L. Moore, Eunice Wiederhold, and C. Donald Atkins. *Fruit Products J.* 23, (9), 270-275, 285 (May 1944).

(2) Ascorbic Acid Retention in Florida Grapefruit Juices — I. During Commercial Canning. Edwin L. Moore, Eunice Wiederhold, C. Donald Atkins, and Louis G. MacDowell. *The Canner* 98, (9), 24-26 (January 29, 1944).

(3) Tangerine Juice Products, C. D. Atkins, E. L. Moore, and J. L. Heid. *Fruit Products J.* 23, (5), 132-134, 152, 153, 157, (January 1944).

(4) The Recovery of Flavoring Oil from Persian Limes—Preliminary Experiments. C. D. Atkins, Eunice Wiederhold, and J. L. Heid. *Fruit Products J.* 23, 306-308 (June 1944).

(5) Grapefruit Cannery Waste Yields Crude Citrus Pectin. C. N. Pulley, E. L. Moore, and C. D. Atkins. *Food Industries* 16, (4), 94-96, 136, 137 (April 1944).

Price Fixed for Fruit In Bushel Containers

Maximum prices for oranges and grapefruit produced in Florida and Texas and packed in bushel containers shall be five-eighths of the prices of the same fruit packed in standard containers, the Office of Price Administration has announced. The bushel baskets will hold five-eighths as much as the standard boxes.

This bushel ceiling was established because Florida and Texas citrus producers have been using more and more bushel baskets. They found it increasingly difficult to obtain enough standard containers. The use of the baskets, however, made it necessary for each to be weighed and marked. The new prices on a bushel basket basis eliminate the need for this extra work.

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Pulling Versus Clipping Of Florida Oranges

By G. A. MECKSTROTH*

For years clipping has been the accepted method of harvesting citrus fruit, but recently, on account of the labor shortage, a number of packing house managers had a considerable portion of the crop harvested by pulling the fruit. It therefore seems desirable to present some of the results of studies on more than 38,000 fruits, made during six seasons by the U. S. Department of Agriculture at Orlando, Florida, with reference to the immediate effect of pulling and the comparative keeping quality of clipped and pulled oranges. The results show that pulling decreased total decay and stem-end rot*, but may increase blue mold rot, especially in very ripe oranges. They also show that it is usually possible to predict the relative amount of stem-end rot that will develop in pulled oranges; the greater the proportion of stem parts adhering, the greater the amount of stem-end rot that can be expected because these stem parts carry the stem-end rot organisms. Borax treatment reduced both stem-end rot and blue mold rot in both clipped and pulled oranges.

Whether to pull or to clip Florida oranges is a question that has received considerable attention from packing house operators; it was reported that last season certain picking crews refused to clip the fruit but were willing to pull it. With a still larger crop in prospect for next year and with a shrinking labor supply, the method of harvesting will become even more important. This question dates back to an early period of the industry in the State. P. H. Rolfs, speaking before the 1935 meeting of the Florida State Horticultural Society, recalled that back in the nineties when they were discussing the best kinds of clippers for citrus, an enthusiast from Polk county spoke in favor of pulling oranges and grapefruit. He was overwhelmed by the growers who advocated clipping fruit, and he left the meeting in a fury.

Rolfs also calls attention to an announcement in April, 1935, by J. R. Winston that

pulling instead of clipping grapefruit retards stem-end rot. These tests which were made several years ago and reported in U. S. Department of Agriculture Circular 396, showed that grapefruit can be pulled at almost any time during the normal marketing period, and that when this is done there is less stem-end rot. Winston and Meckstroth reported in the Proceedings of the Florida State Horticultural Society for 1943 not only that lemons can be successfully harvested by pulling, but also that pulled lemons decay less rapidly than clipped ones.

There are a number of factors that affect the subsequent storage life of pulled fruit. Some of these are: (1) the proportion of stem parts adhering to the fruit; (2) whether or not borax is applied to harvested fruit; (3) maturity of the fruit; and (4) the time of year when fruit is harvested.

Experimental Results

Tests were made with approximately 1200 clipped and 3,000 pulled fruits on Conner, Pineapple and Valencia varieties, and the results are shown in table 1. In most of the tests the fruit was washed, allowed to dry, and stored for three weeks at 70° F.; but some was stored two weeks at 50° plus one week at 70°, simulating temperatures encountered in transit and marketing. After two weeks' storage the total decay in the clipped fruit was 15.0 percent as compared with 11.8 percent in the pulled fruit. The reduction in the amount of stem-end rot in the pulled fruit more than compensated for the increase in the amount of blue mold rot. The same general trend was observed when this fruit was held for three weeks.

Amount of Button Parts Adhering

When oranges are harvested by pulling, the stem button is seldom completely removed. A test was made to determine the relation of the amount of adhering button parts (receptacle or "cushion," calyx, and pedicel) to subsequent decay of the fruit. Pulled fruits were classified as follows: entire calyx adhering, part of calyx adhering, stem-cushion or receptacle only adhering, and completely disbuttoned.

When 2400 pulled fruits of Seedling, Conner and Pineapple varieties were classified according to the amount of button parts adhering, and then stored for two weeks at 70° F. (table 1, second part), there was a big reduction in the amount of total decay and of stem-end rot in those lots with the calyx entirely removed (cushion only adhering). When a portion of the calyx

remained, there was about as much decay as when the entire calyx remained — 11.4 and 11.9 percent, respectively. There was least decay when the stem cushions only were adhering — 3.2 percent total decay compared with 11.9 percent when the entire calyx remained. When completely disbuttoned, the amount of total decay was greatly increased due to blue mold rot. The complete removal of the button caused injuries in many fruits, and these provided avenues of infection for the blue mold fungus.

It is evident that the relative amount of stem-end rot that may develop in pulled fruit depends on the amount of button parts remaining on the fruit. Thus, when the cushions only are adhering or the calyx is completely removed, stem-end rot is much reduced, but if a portion of the calyx adheres, stem-end rot is not likely to be decreased.

Percentages of Button Parts Adhering In Commercially Pulled Fruit

In this connection it is interesting to note the results of counts on commercially pulled oranges made at three packing houses, each having several picking crews. The following varieties were used: Parson Brown, Hamlin, Homossassa, Seedling, Pineapple and Navel. These counts were made on December 9, 17, and 21, 1943, and give a good overall picture of what may be expected from commercial picking crews. Four field crates from each of 24 different crops, totalling over 18,000 fruits, were inspected and classified according to the proportion of stem parts adhering. The range and average percentages were as follows: entire calyx adhering, 10.8 to 64.4 percent, average 39.1 percent; part of calyx adhering, 9.4 to 25.5 percent, average 20.0 percent; cushions only adhering, 5.2 to 50.6 percent, average 30.3 percent; completely disbuttoned 0.4 to 10.3 percent, average 3.0 percent; "plugged" (torn rind), 0.9 to 33.9 percent, average 6.2 percent; woody stems attached, 0.1 to 7.0 percent, average 1.3 percent. In one instance 33.9 percent of the fruit was "plugged"; this grove had been damaged by frost and bore a light crop of large, coarse, spongy fruit. Observations in numerous packing houses during the past two shipping seasons indicate that the percentage of rind tears or plugging in oranges harvested by pulling is likely to fall within the range shown by the above figures. It is therefore important for the picking foreman to check results and shift from pulling

(Continued on page 12)

*Associate Pathologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

* Stem-end rots are caused by *Diplodia natalensis* and *Phomopsis citri*. *Penicillium digitatum* actually appears as an olive green mold, but it is commonly referred to as "blue mold."



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Value Of A Complete Fertilizer Program Was Proven By The Storm

The recent storm demonstrated one outstanding fact — that groves with heavy foliage withstood storm damage better, and retained a much greater percentage of fruit, than those trees with light foliage.

This statement is made as the result of actual visual surveys. In numerous instances groves directly across the road from each other, or groves which actually joined were checked. And in cases where one grove was receiving a complete fertilizer and nutritional program and the other was not, it was shown that the grove receiving the incomplete program had fruit and tree losses from three to four times as great as the groves being adequately fed.

WE OFFER A SUGGESTION--

Regardless of the amount of fruit lost, groves in the path of the recent storm have undergone a terrific shock, so we strongly recommend that growers start immediately applying a complete fertilizer application, carrying the necessary plant foods to re-establish the vitality of their trees as quickly as possible.

WE FURTHER SUGGEST--

That in view of the fierce lashing which the trees took during the storm there is high probability of a severe infection of melanose developing in the spring, and in order to anticipate this contingency we strongly urge that in addition to the normal melanose spray made after petal fall that a dormant copper spray be applied in January.

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PULLING VERSUS CLIPPING OF FLORIDA ORANGES (Continued from page 9)

to clipping in certain groves or with certain picking crews, in cases where he finds that many fruits are being plugged. The greatest amount of plugging was found in Homossassa, Parson Brown and Seedling varieties, and the least amount in Pineapple, Hamlin and Navel varieties.

Effect of Borax Treatment on Decay of Pulled and Clipped Fruit

Treatment with borax reduced both stem-end and blue mold rot. Tests were made in April and May, 1936, on about 300 pulled and 700 clipped Valencia oranges. The fruits were stored for two weeks at 70° F., and showed that borax treatment of the pulled fruit reduced stem-end rot from 63.7 to 15.4 percent. In clipped fruit the borax treatment reduced stem-end rot from 58.7 to 6.5 percent. There was less than one percent blue mold rot. In one test in February and March, 1941, with very ripe Parson Brown and Hamlin oranges, stored two weeks at 50° plus one week at 70°, the borax treatment reduced stem-end rot in the clipped fruit from 16.7 to 10.2 per-

cent, and blue mold rot from 15.6 to 8.8 percent. In pulled fruit there was a reduction in blue mold rot from 43.7 to 12.3 percent, but an apparent increase in stem-end rot from 11.5 to 16.5 percent. This increase may have been due to early stages of blue mold rot which developed at the stem-end and were recorded as stem-end rot at the time the inspection was made; the early stages of blue mold rot setting in at the stem area may readily be confused with stem-end rot. This fruit was washed and allowed to dry but was given no other treatment.

Seasonal Prevalence of Blue Mold Rot

The time of year is also an important

factor in determining the amount of blue mold rot that is likely to develop. Blue mold rot is caused by an organism adapted to fairly cool temperatures; under Florida conditions it is common in the groves and is a serious factor during marketing in those months when the mean monthly temperature is below 65° F. U. S. weather bureau records covering a period of 50 years show that the mean monthly temperatures at Orlando are as follows: September, 83; October, 74; November, 66; December, 61; January, 61; February, 62; March, 67; April, 71; May, 76; June, 80. The midseason varieties are harvested during the winter months and the late varieties during the spring months. The percentage of blue mold rot in Seedling or-

anges harvested in January, 1937, was 12.3 percent for clipped fruit and 22.0 percent for pulled fruit. Clipped Conners harvested in January, 1937, had 2.7 blue mold rot compared with 12.4 percent for pulled fruit. In tests with Valencia oranges in April and May, 1936, when the temperatures were too high for the best growth of the fungus, the percentage of blue mold rot in pulled fruit was about the same as that in clipped fruit. Again in May, 1943, the seasonal effect was brought out in a test on over 1200 Valencia oranges; the percentage of blue mold rot in the pulled fruit was 2.6 compared with 3.3 in the clipped fruit.

Discussion

Some of the fruit used in the experiments was harvested by regular commercial pickers and the rest was picked by the laboratory workers without using more than ordinary care. No special pains were taken to prevent tearing of the rind. It has been observed that the ease with which citrus fruit can be pulled varies with varieties and with the time of year. There is tearing of the rind early in the season before the fruit is mature and also late in the season when the

TABLE 1. Percentage decay in pulled and clipped conner, Seedlings, Pineapple, and Valencia Oranges.

Method of Harvesting	Part of button adhering	No. of fruit	After two weeks			After three weeks		
			Total decay, including misc. rots %	Stem-end rot %	Blue mold rot %	Total decay, including misc. rots %	Stem-end rot %	Blue mold rot %
A 1/								
Pulled		3083	11.8	5.7	6.0	33.6	21.3	11.9
Clipped		1269	15.0	11.0	3.8	43.5	36.6	6.8
B 1/		1201	11.9	7.8	4.0	37.5	30.0	7.1
Pulled	Entire Calyx							
do	Part of calyx	306	11.4	6.5	4.2	40.5	30.4	9.2
do	Cushion only	468	3.2	0.6	2.4	18.2	6.4	11.3
do	Completely disbuttoned	425	33.4	4.5	28.2	54.1	10.6	41.9
Average: Pulled	As specified above	2400	14.0	5.7	8.0	32.9	22.0	14.3
Clipped	Entire button	597	11.7	5.9	5.9	54.1	43.4	10.7

1/ Fruit in section B is included in Section A.

cent, and blue mold rot from 15.6 to 8.8 percent. In pulled fruit there was a reduction in blue mold rot from 43.7 to 12.3 percent, but an apparent increase in stem-end rot from 11.5 to 16.5 percent. This increase may have been due to early stages of blue mold rot which developed at the stem-end and were recorded as stem-end rot at the time the inspection was made; the early stages of blue mold rot setting in at the stem area may readily be confused with stem-end rot. This fruit was washed and allowed to dry but was given no other treatment.

Stage of Maturity

It is well known that the stage of maturity of the fruit has an important bearing on the amount of decay that develops. These

factor in determining the amount of blue mold rot that is likely to develop. Blue mold rot is caused by an organism adapted to fairly cool temperatures; under Florida conditions it is common in the groves and is a serious factor during marketing in those months when the mean monthly temperature is below 65° F. U. S. weather bureau records covering a period of 50 years show that the mean monthly temperatures at Orlando are as follows: September, 83; October, 74; November, 66; December, 61; January, 61; February, 62; March, 67; April, 71; May, 76; June, 80. The midseason varieties are harvested during the winter months and the late varieties during the spring months. The percentage of blue mold rot in Seedling or-

new growth has started and the rind has become spongy but before the fruit is ready to drop from the tree. Between these two extremes oranges can be pulled with a minimum of injury. However, there is a knack to pulling the fruit successfully. A straight pull will result in more injury than if the fruit is pulled at an angle with a slight wrist movement, like that used by peach and apple pickers. It should not take pickers long to learn this. It is sometimes found that the fruit on certain branches of a tree can be pulled more easily and with less injury than on other parts of the same tree. Also during severe droughts pulling sometime causes considerable injury. Experience has shown that the ease with which

(Continued on page 18)

CITRUS GROWERS SUSTAIN HEAVY LOSS

(Continued from page 5)

erable damage due to salt spray." His appraisal of damage to Hillsborough and eastern and northern Pasco counties was negligible. In western Pasco he reported grapefruit loss as probably 20 to 25 percent, in Pinellas county 35 to 40 percent, Indian River section, probably 25 percent, Manatee county 40 percent, western Lake county 25 percent, eastern Lake, Orange and Volusia counties, 50 percent, and Polk, Highlands and Hardee counties 75 percent. He placed the loss of early and mid-season oranges at 25 percent, Valencias 5 percent and tangerines, negligible.

Wilson & Toomer Fertilizer Company stated that they had not as yet made up any estimate of the storm loss.

We were unable to contact Fred Coffee, manager of Armour & Company, to secure a report from his company.

Frank D. Jackson, president of Jackson Grain Company, Tampa, reported that the survey of his company indicated that grapefruit overall loss would run from 50 to 55 percent and damage to oranges would average approximately 25 percent.

Fred J. Woods, vice president and treasurer Gulf Fertilizer Company, Tampa, stated that he felt the ultimate loss would run much higher than is now apparent due to increasing signs of injury to fruit still on the trees, and further indicated that he felt that accurate reports would be hard to make at this time.

W. H. Klee, manager Naco Fertilizer Company, Jacksonville, said that "55 percent of grapefruit is on the ground and 20 percent of oranges. This loss will be augmented by approximately an additional 20 percent of grapefruit and oranges due to fruit now on trees on twisted limbs which will eventually drop, and al-

so due to rot damage and splits."

A representative of Swift & Co., Agricola, stated that he was inclined as the result of his company's survey to believe that the WFA figures were reasonably accurate but that it was his personal belief that

the orange loss might be greater than the WFA report indicated.

Reports to The Citrus Industry from growers and others in touch with the situation run pretty much true to the estimates which have been quoted.

Despite Storm Damage

**It is very important
that trees be given
extra good care as
soon as possible.**

**Let us know how
we can be of help
to you.**



**NACO FERTILIZER
COMPANY** JACKSONVILLE 1
... FLORIDA

HOTEL PUTNAM

Fireproof

**DeLAND'S FINEST
HOTEL**

**R. H. Brown
Owner-Manager**

The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER CO.

To Our Friends And Customers:

Various estimates have been made on the amount of crop damage done by the recent storm and we submit here a resume of our information in the hope that it may be of some value to you.

In the territories covered by our representatives, we estimate the overall loss of grapefruit in the state to be from 50 to 60 percent. We estimate the loss on early oranges at 25 percent and on Valencias at 15 percent.

The vegetable crop on the West Coast, with the exception of celery, escarole and cabbage, is practically a total loss. On celery, cabbage and escarole the loss will not run over 25 or 30 percent. Around Lake Okeechobee the loss on all vegetables, except celery, will run 75 to 80 percent, on celery 25 percent.

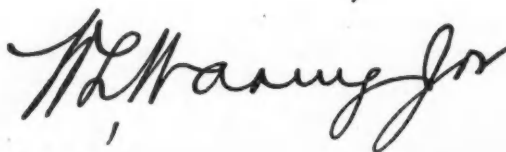
The salvage will be very small. Some of the fruit which is on the ground that will pass the test will be shipped to the fresh fruit market and some will go to the canning plants, but as practically none of the canning plants were in operation when the storm hit, and all of them cannot get into operation in time to take care of this salvage there is only a small percentage of the fruit which can be handled by the canning plants.

We believe that what fruit we have left in the state should find a good market and the overall picture will not be so dark.

The growers are in better shape to stand a disaster of this kind than they have been in the past and we are optimistic about the final outcome. We have suffered storms, freezes and other disasters in the past and have always been able to overcome the effects of such disasters, as we will in this instance.

We want to assure all of our customers that we are prepared to cooperate with them in any way possible.

Very truly yours,



President



We ran into a feller the other day who had the notion that about the only thing fertilizer was good for was to smell bad, but we shore changed his mind about it after we got through oratin' and explainin' to him. When you really get right down to studyin' what fertilizer does both in war and peace times it's mighty near like a miracle. There ain't nothing that has more to do with the production of the nation's supply of food and fiber and a lot of raw materials than fertilizer does.

Take this year of 1944 the use of fertilizer will play a most vital part in the production of food stuff for not only our armed forces and the civilians at home but for our allies on the other side of the water. These here same fertilizers make it possible for our growers to raise a heap more produce on a lot less acres, which has saved a lot of labor in cultivatin' and harvestin' which counts for a very great deal in times like these. Experts tell us that fertilizer is now being' used on seventy million acres of crop land and can be used on 175 million more acres of crop land, not to mention another lot of pasture land the same size.

Just to show how folks are beginnin' to appreciate the value of fertilizer the use of it has grown from 7,500,000 tons in 1938 to more than 11,500,000 tons in 1943. 'Cordin' to our figurin' that's more'n fifty percent in five years and this in spite of labor shortages, transportation troubles and sich. Looks like this year the increase in the use of fertilizer would be the biggest ever.

Fertilizers has got quite a lot of history. First mixed fertilizer was made in Baltimore back in 1850 and as late as 1868 only fifty thousand tons was used in the whole United States. The South Carolina phosphate deposits back in 1867 furnished a lot of fertilizer and from then on until the beginnin' of World War I its use grew fast. From 1914 to 1916 consumption fell off but in 1920 it was back up again and kept growin' as farmers and growers saw its benefits until in 1930 the country was usin' 8-million tons. The Great Depression cut the figger down some but in 1937 the business was way back up again.

'Cording to the U. S. Department of Agriculture fertilizer prices was only 21 percent higher in 1944 than in 1910-14, while farmers was gettin' 96 percent more for their products. Fertilizer prices now is only a very little higher than in 1939 and no increase has been made since 1942 while farm products is bringin' 40 percent more now than in 1939.

The U. S. Bureau of Internal Revenue released figgers showin' that all fertilizer companies filin' income tax reports from 1927 to 1940 had made a net average income of only 95-one hundred's of one cent on each dollar of sales they made durin' that 14-year period.

So long. See you next month.

UNCLE BILL.

COMMUNICATION

The Time Is Now!

It is an old Chinese custom to pay doctors to keep them well.

The Citrus Industry is in excellent health and the creation of a Citrus Futures Market will help keep it that way.

The products of the earth, the things we live by, wheat, cotton, butter, eggs, citrus, are known as commodities. It has been man's custom from time immemorial to use these commodities as mediums of exchange and hence a closely integrated group of Exchanges in commodities has developed where brokers and traders meet. It is through the facilities of these Exchanges that the producers — the growers — the middleman — the manufacturers — the consuming public benefits in the flow of commodities from the earth to their ultimate use. The entrepreneur performs a necessary though hazardous function by taking up the slack in providing insurance for both producer and consumer through the Commodities Futures Market.

In 1790 Alexander Hamilton consolidated the various state debts by the sale of \$80,000,000 of Federal "Stock" paying 6 percent. Immediately, under a buttonwood tree in Wall Street, trading was started in this issue, and from this market developed the New York Stock Exchange. These securities were actually obligations of the Federal Government, and if I remember correctly, the first stock as we use the term today, was Morris and Essex — then came Baltimore and Ohio — Erie and the railroad financing.

Manchester had the first cotton futures market but Liverpool in 1870 soon displaced it. Then came our own New York Cotton Exchange, 1870, New Orleans, 1871, Chicago Board of Trade, 1859, Winnipeg Grain Exchange, 1904, and many others.

As far back as 1800, the form known as "To Arrive" was in general use in the United States, for commercial commodities.

The present day futures contract represents a legal agreement, enforceable by law and the rules of the established Exchanges, to deliver or accept a definite quantity of a particular commodity during a specified calendar month at an agreed price.

Such contracts differ only in

month of delivery and price. When difference in quality and weight arise on delivery, adjustments are agreed upon. The ultimate consumer with fixed purchasing power benefits by more stabilized prices; the processor knows the price of his raw material and the grower knows how much he will receive for his crop.

A Futures Contract may be liquidated or off-set before delivery or acceptance of the actual commodity and the speculator rarely avails himself of his privilege of making or accepting delivery.

Butter, 5 points equals \$9.60 per contract of 19,200 lbs.

Cocoa Beans, 1 point equals \$3.00 per contract of 30,000 lbs.

Coffee, 1 point equals \$3.25 per contract of 250 bags.

Copper, 1 point equals \$5.60 per contract of 25 long tons.

Cotton, 1 point equals \$5.00 per contract of 100 bales.

Cotton Seed Oil, 1 point equals \$6.00 per contract of 60,000 lbs.

Eggs, 1/20c per doz. equals \$9.00 per contract of 18,000 doz.

Grains 1/8c per bu. equals \$6.25 per contract of 5,000 bu.

Hides, 1 point equals \$4.00 per contract of 40,000 lbs.

Pepper, 1 point equals \$3.36 per

FOR EVERYTHING THAT GROWS ON EARTH

High Grade TEXAS CALCINED MAGNESITE

Manufactured By J. J. Cates, Llano, Texas

Home Office, Cates Building, Sanford, Fla.

A fertilizer material rich in Magnesium for grove, nursery and farm requirements. Contains an average of 80% Magnesium as Magnesium Oxide — **immediately** active and available for improving soil pH Value, correcting Magnesium Deficiency, and building up a Magnesium reserve in the soil.

Your Fertilizer Manufacturer Will Supply

TEXAS CALCINED MAGNESITE

in your favorite fertilizer brands at from 2 to 4 units for maintenance depending upon conditions, or will recommend **direct application** for correction of severe Magnesium Deficiency at a rate per acre to suit your particular condition.

"BRONZING" (Magnesium Deficiency)

of **citrus trees** and the various symptoms of Magnesium Deficiency in **vegetables** indicate serious losses in production which you cannot afford to take. The use of **Texas Calcined Magnesite** will pay big dividends in healthy trees and plant condition, increased volume of production, and improved quality of fruits and vegetables.

TEXAS CALCINED MAGNESITE now used and sold by:

Lyons Fertilizer Company, Tampa, Florida
Wilson & Toomer Fertilizer Company, Jacksonville, Florida
Florida Favorite Fertilizer Company, Lakeland, Florida
Haines City Fertilizer Company, Haines City, Florida
Polk County Fertilizer Company, Haines City, Florida
Maxcy Fertilizers, Inc., Frostproof, Florida
Wheeler Fertilizer Company, Oviedo, Florida
Chase & Company, Sanford, Florida
Citrus Culture Corporation, Mount Dora, Florida
Plymouth Fertilizer Works, Plymouth, Florida

contract of 33,600 lbs.

Rubber, 1 point equals \$2.24 per contract of 10 long tons.

The above is a partial list. Assuming oranges were traded:

Oranges, 1 point equals \$4.00 per contract of 400 boxes.

An Associated Press report of July 10, 1944, states that the annual report of W. E. Wilson, of the Federal State Market News Service, shows that thirty million boxes of Florida Citrus was used by canning and concentrate plants. This was about 37 percent of the total crop of eighty million boxes; a greater amount than the State's annual average production for the years 1929 through 1934.

The Citrus Fruit Laws, Florida Statutes 594-600, establish a basis for grading; the last obstacle standing in the way of a Citrus Futures Market.

It is the studied conclusion of the author, after exhaustive research, that a substantial contribution to the economic life of both the State and the Nation would result from the formation of a Citrus Futures Market.

The fundamental services performed by the Futures Market are:

1. Correlate world demand and supply.
2. Provide machinery for continuous trading, thereby enabling a fair price to be quoted for the commodity at any time.
3. Discount the impact on prices of the forecast supply and demand.
4. Spread over a long period the burden of distribution of a quickly harvested agricultural crop.
5. Provide greater security to justify granting liberal credit facilities by bankers.
6. Make liquid markets available at all stages of production and distribution and also provide a valuable safeguard in the form of insurance against price fluctuations.

During the month of May, 1944, 21,200,000 shares were bought and sold on the New York Stock Exchange, at an average price of \$27.19 per hundred for which services the brokers received about \$8,162,000 in commissions.

Twenty hard-working Citrus Futures brokers should develop \$300,000 per annum in commissions. You may not be interested in this idea, but if you have a son or daughter with ability and integrity who would like to be self-supporting, have them communicate with the author. **THE TIME IS NOW!**

JAMES B. WILLIAMS,
Tampa Terrace Hotel, Tampa, Fla.

Alexander Pope said it...



"Where grows? — Where grows it not? If vain our toil, we ought to blame the culture, not the soil."

No, Alexander Pope wasn't writing of Florida growers. In fact, Pope — an English poet — wrote these words of wisdom about 50 years before the 13 colonies became the United States of America. But the general truth he expressed here is just as timely today as it was back in 1732.

Florida farmers and growers know, as Pope did, that soil needs proper fertilization and correct cultivation if it is to produce a maximum yield of quality crops.

What's more, many successful growers have found that fertilizers prepared especially for Florida soils produce the best results. That's why they use Gulf Fertilizers — the Friendly Fertilizers that are keyed to the needs of Florida soils — fertilizers that have been developed through more than 40 years of soil study and actual field experiments.

Don't blame your soil. Consult your local Gulf field man. He will recommend the right plant foods in the right amounts at the right time so you can raise a record crop from every row.

For Everything that
Grows in Florida...use

GULF Brands of
FERTILIZER



The Gulf Fertilizer Company

Tampa and Port Everglades, Florida

PULLING VS. CLIPPING ORANGES

(Continued from page 12)

fruit can be pulled varies from year to year and that at times considerable "plugging" results. During the 1942-43 and 1943-44 seasons oranges responded to pulling better than in some former years; this was especially true of the Valencia variety. As a rule pulling causes less injury in grapefruit than in oranges.

Packing house managers who have had a large part of the late oranges pulled as well as some of the midseason varieties, feel that tearing of the rind or "plugging" is no more serious than injuries from clipper cuts and stem punctures or bruises. The amount of blue mold rot in pulled fruit will depend on the maturity of the fruit and the time of year. Under natural conditions blue mold rot is serious in groves and packing houses only during the winter months and is of little importance in the fall and spring months. Market reports also show that blue mold rot causes heavy losses on arrival at destination during the colder months, but that losses during the warmer months are very light. The cool weather during harvesting of midseason varieties favors its development, whereas the higher temperatures prevailing when late varieties are harvested tend to keep this rot in check.

Classified Ads

Will pay \$5.00 for a used Citrus BUDDING KNIFE in fair condition. Can also use badly worn budding knives if still serviceable for \$2.50. Will buy a number of "Rogue" citrus seedlings from nurserymen, 10 cents per seedling. Must be vigorous variant plants. Donald J. Nicholson, 1224 Palmer St., Orlando, Fla.

ORCHARD POWER SPRAYER — Prefer Friend. Tank 200 to 300 gals. Capacity 15 gals. up. Hose, accessories. **TUNGSTON PLANTATION, LAMONT, FLORIDA.**

CITRUS TREES—Best quality usual varieties on sour orange or rough lemon stock. Robt. P. Thornton, c/o Clay Hill Nurseries Co., Box 2880, Tampa, Florida.

WANTED — Washer for citrus fruit. Also complete equipment for small packing house. Owen Godwin, Sebring, Florida.

DREAM NAVEL ORANGE — Florida's earliest and finest-flavored juiciest fruit Patented under U. S. Plant Patent No. 625. Prolific and always ready to ship before October 15. Guaranteed to have 5½ gallons of juice per box and passes 10½ to 12½ to 1 by October 15 or sooner. Solids 11.25 to 11.75 before October 15. No budded trees for sale. Budeyes sold in 1000 lots \$500.00 — bud your own stock. Budded trees \$15000.00 per M. **ROYAL PURPLE RESEARCH NURSERY, Orlando, Florida.**

Charles J. Brand, Fertilizer Head, Receives Decoration...

At a luncheon given by the new Chilean Ambassador, Marcial Mora, in Washington recently, the decoration of Commander of the Order of Merit of Chile was conferred upon Charles J. Brand in the presence of a group of leaders in government, agriculture, business, and science.

In conferring the decoration the Ambassador cited Mr. Brand's long service to American agriculture as scientist and executive in the U. S. Department of Agriculture, and in

his capacity as executive secretary and treasurer of The National Fertilizer Association. He referred to Mr. Brand's early work on alfalfa, an important strain of which came from Chile; to his work as chief of the Bureau of Markets from 1913 to 1919, and as Federal nitrate distributor in World War I; to his numerous trips to Europe to study nitrogen and other fertilizer problems; and to his trip to Chile in 1943 to attend the Fourth South American Congress of Chemistry.

The POTASH you are using is **AMERICAN** Potash, and

1. IS SAVING YOU LABOR

Turning livestock on pasture earlier and keeping it there longer
Preventing lodging of grain and making other crops easier to harvest
Producing the crop with the use of fewer acres

2. IS INCREASING YIELDS

Thickening and strengthening the stand per acre
Enabling crops to better withstand diseases and unfavorable weather
Making grain heavier and fruit larger and juicier

3. IS IMPROVING QUALITY

Growing root crops which are more marketable in shape and size
Increasing the feed value of forage crops
Improving the carrying and keeping quality of fruits and vegetables

4. IS PREVENTING SOIL DEPLETION

Maintaining reserves of plant food in the soil
Encouraging good growth of nitrogen-producing legumes
Balancing the crop's use of other plant foods.

**AMERICAN POTASH INSTITUTE**

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1155 Sixteenth St., N. W.

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THE POTASH YOU ARE USING IS INCREASING YOUR EFFICIENCY IN THE WAR EFFORT